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LISTS OF SPECIES

# Dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae) of the Floresta Nacional Contendas do Sincorá, Bahia, Brazil

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**ABSTRACT:** The Floresta Nacional Contendas do Sincorá (FLONA-CS) is located at the southeastern edge of the Chapada Diamantina, Bahia, Brazil, and includes in its territory phyto-physiognomic formations that are typical of the Caatinga biome. The Coleoptera fauna, including the Scarabaeinae subfamily, is poorly known in the Caatinga. Therefore, this study aims to: 1) know which species of Scarabaeinae are attracted to baited pitfall traps at the FLONA-CS; 2) provide an illustrated key to identify the species of Scarabaeinae collected at the FLONA-CS. We collected a total of 2143 individuals distributed in 21 species, 12 genera and five tribes. The species *Canthon* aff. *piluliformis*, *Canthon* aff. *curvipes*, *Canthon* sp. and *Deltochilum verruciferum* were the most abundant, representing over 70% of the individuals. *Deltochilum verruciferum* is one of the most typical species of the Caatinga biome.

## INTRODUCTION

The Caatinga biome is located in a semi-arid region and consists of a thorny shrub mosaic and seasonally dry forests that spread for approximately 800.000 km$^2$ (Leal *et al.* 2005). Although considered a unique Brazilian biome, little attention has been given to its landscape and to the conservation of its biota (Silva *et al.* 2004). It is estimated that about 30.4 to 51.7% of its territory was modified by human activities. Nevertheless, this biome has the lowest number and extent of protected area of all the Brazilian biomes; less than 1% of its area is under the category of integral protection (Leal *et al.* 2005).

There are few studies about the order Coleoptera from the Caatinga. Iannuzzi *et al.* (2003), registered 42 families for the Caatinga across the states of Alagoas and Sergipe, collected with Malaise traps. Maia *et al*. (2003) recorded more than 60 species of the family Cerambycidae.

The beetles of the subfamily Scarabaeinae (Coleoptera: Scarabaeidae), popularly known as dung beetles, have also been poorly studied in terms of their diversity in the Caatinga. Until the present, 14 papers related to the ecology and faunal surveying of dung beetles in the Northeast of Brazil have been published (Endres *et al*. 2005, 2007; Hernández 2005, 2007; Lopes and Louzada 2005; Lopes *et al.* 2006; Silva *et al.* 2007, 2010a; Costa *et al*. 2009; Filgueiras *et al.* 2009, Gillet *et al*. 2010; Filgueiras *et al.* 2011; Liberal *et al*. 2011; Vieira *et al*. 2011). Four of these studies focussed exclusively on the Caatinga region (Lopes and Louzada 2005; Hernández 2005, 2007; Liberal *et al.* 2011). This number is small compared to the size and importance of the system, which has many endemic species, and the degree of threat which it faces (Araújo *et al*. 2005).

Dung beetles are fundamental in important processes of ecosystem function such as nutrient cycling, increased soil aeration and fertility, secondary seed dispersal and biological control of flies and nematodes, including some of medical importance (Halffter and Matthews 1966; Koller *et al*. 2007; Nichols *et al*. 2008). The community structure of these insects is strongly related to other organisms that provide food sources, being considered as bioindicators of environmental quality (Halffter and Favila 1993; McGeoch *et al.* 2002). Thus, studies relating to the diversity of dung beetles from the different biomes that compose the northeast region of Brazil are important sources of information for the conservation of dung beetles in poorly known regions, such as the Caatinga.

The Floresta Nacional Contendas do Sincorá (FLONA-CS), located in the northern edge of the Caatinga, has high conservation value for the Caatinga biome as it combines in its territory a mosaic of phyto-physiognomic formations such as arboreal caatinga (caatinga arbórea), shrub caatinga (caatinga arbustiva), caatinga in regeneration process (capoeira), liana forest (vegetation characteristic of a transition between Caatinga and Atlantic forest biomes), savanna (cerrado grassland) and riparian forest. Although it is categorised as a sustainable conservation unit, the FLONA-CS has not been used for exploitation of natural resources since 1997 (BRAZIL 2006). Therefore, the existence of this conservation unit represents a guarantee of biodiversity conservation of phyto-physiognomic formations of Caatinga located on the southeast part of Chapada Diamantina. Thus, the objectives of this study were: 1) to know the species of Scarabaeinae attracted to baited pitfall traps at the FLONA-CS; 2) to provide a illustrate key to identify the species of Scarabaeinae collected at the FLONA-CS.

## MATERIALS AND METHODS

### *Study site*

The area of the Floresta Nacional Contendas do Sincorá covers 11,034 ha and is situated on the southern portion of the Chapada Diamantina (13°46'–14°00'S, 41°03'–41°10' W). The climate is semi-arid, with average rainfall

of 600 mm. The rainy season lasts from November to April and humidity varies between 20-40% (BRAZIL 2006).

The vegetation of the region is deciduous and xerophytic, composed mainly of shrub caatinga, which consists of herbaceous plants, shrubs and a few trees that reach up to 12m. Vegetation characteristic of cerrado, arboreous caatinga and riparian forest can also be found. Two rivers, the Garapa and Goiabeira, cross the area of the FLONA from west to east. The river beds are dry during the majority of the year, containing water only during the periods of higher rainfall, for short periods before runoff or infiltration.

*Data Collection*

The beetles were sampled in three main physiognomies of the FLONA: arboreal caatinga, riparian forest and "capoeira", in two geographically distinct areas for each physiognomy. The samples were carried out in a total of six sites during a dry month (October 2010) and a rainy month (January 2011) in the region. The objective of carrying out data collection at these two stations was to sample groups of dung beetles that have a temporal segregation, since some species present activity restricted to the rainy season or the dry season.

At each site ten pitfall traps were placed containing approximately 50 g of human feces or bovine carcass (decomposing beef) as attractive bait. The use of these two types of bait optimizes the sampling of coprophagous, necrophagous and copro-necrophagous species. In each site the traps were installed along two transects 20 m apart, and the traps were spaced by 10 m. Five traps were installed in each transect, with the two bait types interspersed.

The pitfall trap consisted of a plastic pot measuring 12 cm in diameter and 9 cm height. A small container was used as a bait dispenser and was attached to the lateral side of the opening with wire. The pitfalls were buried flush with the soil and lids supported with sticks were placed above the traps to protect the bait from rain and drying out.

The pitfalls remained installed for 24 hours. The collected material was transported to the Laboratório de Ecologia e Conservação de Invertebrados, Departamento de Biologia, Universidade Federal de Lavras (LECI/DBI/UFLA), Brazil. Species identification was mainly performed by the second author. Voucher specimens were deposited in the LECI and the remaining specimens in the Laboratório de Biologia da Conservação, Departamento de Ciências Naturais, Universidade Federal de São João Del Rei (LACON/DCNAT/UFSJ), Brazil. The collections were authorized by the license number 25951-1 (SISBIO/IBAMA).

A key to the species recorded in the Floresta Nacional was included, as well as figures for each species.

## Results and Discussion

The dung beetle community of the Floresta Nacional Contentas do Sincorá was composed of 21 species, belonging to 12 genera and five tribes (Table 1, Figure1). A total of 2143 individuals were collected, with the species *Canthon* aff. *piluliformis*, *Canthon* aff. *curvipes*, *Canthon* sp. and *Deltochilum verruciferum* being the most abundant, representing over 70% of individuals in the community.

The richness of dung beetles is lower than other brazilian biomes, such as the Amazon Forest (Vaz-de-Mello 1999; Andresen 2002; Vulinec 2002; Quintero and Roslin 2005; Scheffler 2005; Gardner *et al.* 2008 ), the Atlantic Forest (Endres *et al.* 2007; Costa *et al.* 2009; Silva *et al*. 2010a; Filgueiras *et al*. 2011), Cerrado (Milhomem *et al.* 2003; Almeida and Louzada 2009, Silva *et al.* 2010b; Almeida *et al.* 2011) and Pantanal (Louzada *et al.* 2007), although it is higher than in Restinga (Vieira *et al.* 2008) and close to the number of species in other areas of the Caatinga (Hernández 2005; Lopes and Louzada 2005; Hernández 2007).

The myth that a small number of species should occupy an environment with a water stress level as remarkable as the Caatinga (Leal et al. 2005) does not apply to the community of dung beetles at FLONA-CS. This community presented species that are characteristic of Caatinga and elements mainly found in open forest and/or Cerrado and pastures.

A total of 18 species were collected during the dry season, being *Canthon lituratus*, *Dichotomius* aff. *triangulariceps*, *D. geminatus*, *D. nisus* and *Digitonthophagus gazella* collected exclusively in this season. In the rainy season we collected 16 species, with *Diabroctis mimas*, *Ontherus digitatus* and *Onthophagus* aff. *hirculus* being sampled only during this period. There was a strong contrast between the numbers of individuals observed in the two stations, with 75% of individuals sampled during the rainy season.

The observed richness for each physiognomy type was the following: 16 species for the riparian forest, 17 for "capoeira" and 18 for arboreal caatinga, with 42%, 33% and 25% of individuals sampled, respectively. The species *Malagoniella astyanax* was collected in the areas of "capoeira" and arboreal caatinga, with one individual in each vegetation type. "Capoeira"and riparian forest share the same 16 species, with the exception of that species.

We recorded 10 species exclusive to dung bait (*Ateuchus semicribratus*, *Canthon lituratus*, *Diabroctis mimas*, *Dichotomius* aff. *triangulariceps*, *D. geminatus*, *Digitonthophagus gazella*, *Malagoniellla astyanax*, *Ontherus digitatus*, *Onthophagus* aff. *hirculus*. and *Trichillum externepunctatum*). All 21 species of this study were recorded with this type of bait, while only 11 were recorded from bovine carcass. Neotropical dung beetles are mostly specialized on the dung of midsize vertebrates with omnivore diets (Halffter and Mathews 1966). However, the use of bovine carcass as bait was fundamental for the sampling of necrophagous and generalists species, even though these species are not present in large numbers in the community.

Among the species of the tribe Ateuchini, *Trichillum externepunctatum* presents a very wide distribution; its presence is common in woodlands and open habitats, including pastures, cerrado, riparian forest and caatinga below 1600 m (F. Silva pess. com.; Vaz-de-Mello, 2008). It is also found in transition areas between caatinga and cerrado (Lopes *et al.* 2006). At the Floresta Nacional it was recorded with fecal bait in the three physiognomy types and in both seasons. The geographical distribution of *Uroxys bahianus* is poor known. Some individuals were recorded in areas of secondary vegetation (Caatinga, Cerrado and semi-deciduous forest), collected with pitfall

traps baited with human feces and bovine carcass, in the municipality of Feira de Santana, BA (P. Lopes pers. com.). *Canthidium manni* composes a species complex that requires taxonomic revision. Specimens identified as *C. manni* or "affines" to *C. manni* were collected in areas of Caatinga, Cerrado, "Brejo de Altitude", Atlantic forest, Restinga, "Tabuleiro" and pasture in the Brazilian Northeast region (Hernández 2005; Hernández 2007; Lopes *et al*. 2006; Silva *et al*. 2007; Liberal *et al*. 2011). *Ateuchus semicribratus* was also recorded in the areas mentioned above, except "Tabuleiro" (Hernández 2005; Hernández 2007; Liberal *et al*. 2011; F. Silva pers. com.).

The species of the genus *Ontherus* are generally coprophagous and/or saprophagous (Génier 1996). In this study, *Ontherus digitatus* occurred only in traps baited with feces. This species commonly occurs in dry forests and shrub areas below 1500m along the diagonal of open formations in South America (Génier 1996). At the FLONA-CS its occurrence was restricted to riparian forest and "capoeira" during the rainy season, with only five individuals sampled.

The species of *Canthon* have a wide distribution and diverse life habits in the Neotropical region. *Canthon* aff. *piluliformis* is common in different arboreal vegetations associated with the biome Caatinga (F. Silva pess. com.). In this study it was the most abundant, with 25% of the individuals in the community collected during both seasons, at every collection area, phyto-physiognomies and with all types of baits. However, almost half of the individuals were collected in riparian forest areas and more than 80% of individuals were caught in traps with feces in these areas. Thus, individuals of this species are active during the dry and rainy periods and are the most representative in abundance among coprophagous dung beetles at the National Forest. *Canthon lituratus* had low representation in the sampling, with only two individuals captured with fecal bait, one in riparian forest and the other in "capoeira". In Brazil, its individuals are common in open habitats associated with Cerrado, Caatinga, Atlantic Forest and pastures (F. Silva pess. com.; Koller *et al.* 2007; Silva *et al*. 2007; Costa *et al*. 2009; Silva *et al*. 2010a). *Canthon* aff. *curvipes* was one of the most representative species in terms of abundance. It was collected in all vegetation types; however, most individuals were sampled with bovine carcass in the rainy season. This species is the most common among copro-necrophagous dung beetles in this community.

The two species of the genus *Deltochilum* were well represented. *D.verruciferum* is the third most abundant species of the National Forest, which correspond to 14% of all individuals sampled, occuring in all areas and vegetations sampled. This species was recorded with two types of baits, with twice as many individuals collected in bovine carcass as feces, and activity during both seasons. *D. verruciferum* is common and exclusive of dry areas, it can be considered an indicator of this areas, being also reported in other studies conducted in Caatinga (Lopes and Louzada 2005; Hernández 2007; Liberal *et al*. 2011). This species was the most representative, with 47% of total individuals captured, during a study conducted in the state of Paraíba (Hernández 2007). *D.* aff. *calcaratum* is relatively common in dry forests associated with Cerrado, Caatinga and pastures (F. Silva pess.com.). The subgenus *Deltohyboma*, in which this species belongs, requires taxonomic revision, so we can not yet assess more precisely the distribution of this species. The individuals of *D.* aff. *calcaratum* were sampled during all seasons, in all areas, vegetation types and with the two types of baits.

*Malagoniella astyanax* is a coprophagous species, widely distributed in dry vegetations associated with open areas in Brazil (and many other countries, see Halffter and Martínez 1966), but is generally not very abundant in samples (F. Silva pess. com.; Hernández 2007; Silva *et al*. 2007; Liberal *et al*. 2011).

The genus *Dichotomius* was represented by five species in this study, with *Dichotomius* aff.*laevicollis* being the most abundant. It is part of a species complex that is in need of urgent taxonomic revision ("*sericeus*" group). Some species of the "*sericeus*" group are often found in relatively conserved Atlantic Forest and in areas of transition between the Atlantic Forest and Caatinga in the Brazilian Northeast (Silva pess. com.; Liberal *et al*. 2011; Vieira *et al*. 2011). *D. puncticollis* is common in dry forests and shrub areas below 1500m in the northeast of Brazil (F. Silva pess. com). Individuals of this species occurred in three physiognomy sampled. *D.* aff. *triangulariceps* is found in dry forest ecosystems and associated riparian areas (F. Silva pess. com.). *D. geminatus* is relatively common in Caatinga, pastures and riparian forests, mainly in open habitats (Schiffler *et al.* 2003, Hernández 2005, Lopes *et al.* 2006, Liberal *et al.* 2011). All the five species of *Dichotomius* were collected with feces, being *D.* aff. *triangulariceps* and *D. geminatus* collected exclusively with this type of bait. With the exception of *D.* aff. *laevicollis* and *D. puncticollis*, the other species of *Dichotomius* were collected exclusively in the dry season.

*Digitonthophagus gazella* was represented by only one individual during the dry season, from traps baited with feces in the arboreal caatinga. This is an introduced species that is widely distributed in pasture areas (Louzada *et al.* 2009). *Diabroctis mimas* has a wide distribution in Brazil and is also quite common in pastures and open fields. It can also occur in dry forest, gallery forest and secondary growth forest. The occurrence of the species in this study was rare; only one individual was sampled in traps using feces in the rainy and exclusive to the arboreal caatinga.

The dung beetle fauna of the FLONA-CS presents a species richness (21) very close to the values found in the Chapada Diamantina (22) (Lopes and Louzada 2005). The Lopes and Louzada (2005) study aggregated all the landscape elements of the Chapada Diamantina, including Cerrado ecosystems. However, dung were not used as bait during collections, which may have influenced the underestimation of dung beetles richness of the Chapada Diamantina. Another aspect to be considered is the shared species in these two studies. Only one species of Scarabaeinae is listed between this study and Lopes and Louzada (2005) - *Deltochilum verruciferum*, which is considered by us an indicator of the Caatinga vegetation. Under the richness parameter, the FLONA-CS is an important area for dung beetle conservation because is the main unit of conservation of the region, incorporating characteristic elements of the Caatinga biome, which are important for the maintenance of diversity in the

surroundings of the Chapada Diamantina.

The exploration of the FLONA-CS areas, regardless of vegetation type under consideration, can alter the structure of dung beetle communities. With the improper management of these areas, species characteristic of Caatinga may become locally extinct. Thus, the study of dung beetle diversity of the FLONA-CS represented an important step for making decisions regarding management strategies and conservation of habitats in the Caatinga biome.

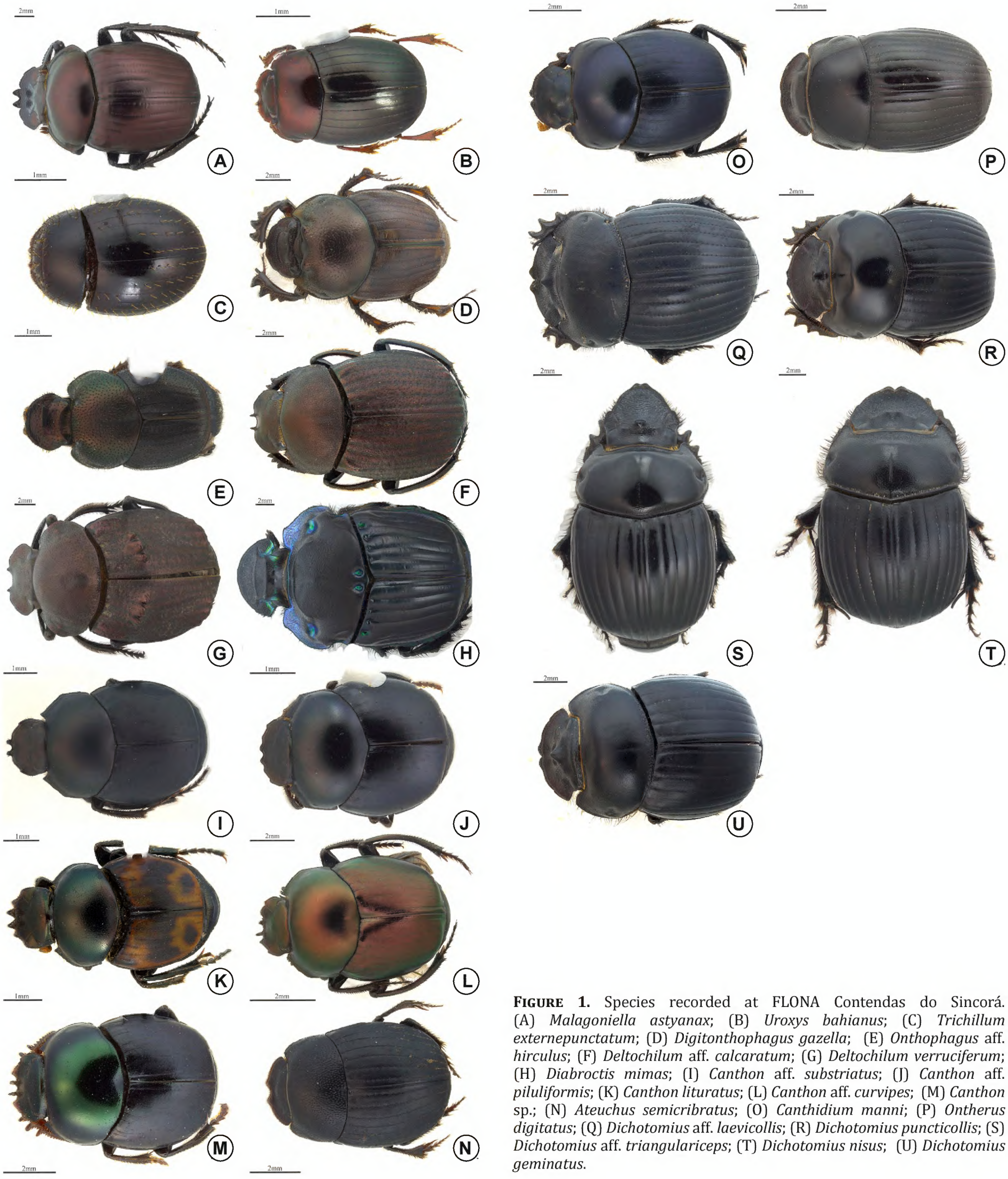


**Figure 1.** Species recorded at FLONA Contendas do Sincorá. (A) *Malagoniella astyanax*; (B) *Uroxys bahianus*; (C) *Trichillum externepunctatum*; (D) *Digitonthophagus gazella*; (E) *Onthophagus* aff. *hirculus*; (F) *Deltochilum* aff. *calcaratum*; (G) *Deltochilum verruciferum*; (H) *Diabroctis mimas*; (I) *Canthon* aff. *substriatus*; (J) *Canthon* aff. *piluliformis*; (K) *Canthon lituratus*; (L) *Canthon* aff. *curvipes*; (M) *Canthon* sp.; (N) *Ateuchus semicribratus*; (O) *Canthidium manni*; (P) *Ontherus digitatus*; (Q) *Dichotomius* aff. *laevicollis*; (R) *Dichotomius puncticollis*; (S) *Dichotomius* aff. *triangulariceps*; (T) *Dichotomius nisus*; (U) *Dichotomius geminatus*.

**Table 1.** Species of Scarabaeinae (Coleoptera: Scarabaeidae) recorded using bovine carcass and human feces in areas of cerrado vegetation, riparian forest and capoeira of the FLONA Contendas do Sincorá – BA, during the dry and rainy season.

| TRIBE | SPECIES | DRY SEASON | RAINY SEASON | ABUNDANCE |
|---|---|---|---|---|
| ATEUCHINI | *Ateuchus semicribratus* (Harold, 1868) | 20 | 32 | 52 |
| | *Canthidium manni* Arrow, 1913 | 2 | 2 | 4 |
| | *Trichillum externepunctatum* Preudhomme de Borre, 1880 | 5 | 5 | 10 |
| | *Uroxys bahianus* (Boucomont, 1927) | 21 | 150 | 171 |
| DELTOCHILINI | *Canthon* aff. *curvipes* Harold, 1868 | 2 | 201 | 203 |
| | *Canthon lituratus* (Germar, 1813) | 2 | 0 | 2 |
| | *Canthon* aff. *piluliformis* Blanchard, 1846 | 176 | 361 | 537 |
| | *Canthon* aff. *substriatus* Harold, 1868 | 1 | 61 | 62 |
| | *Canthon* sp. | 49 | 484 | 533 |
| | *Deltochilum* aff. *calcaratum* Bates, 1870 | 23 | 100 | 123 |
| | *Deltochilum verruciferum* Felsche, 1911 | 110 | 194 | 304 |
| | *Malagoniella astyanax* (Olivier, 1789) | 1 | 1 | 2 |
| COPRINI | *Dichotomius* aff. *laevicollis* (Felsche, 1901) | 44 | 54 | 98 |
| | *Dichotomius puncticollis* (Luederwaldt, 1935) | 12 | 8 | 20 |
| | *Dichotomius* aff. *triangulariceps* (Blanchard, 1846) | 4 | 0 | 4 |
| | *Dichotomius geminatus* (Arrow, 1913) | 7 | 0 | 7 |
| | *Dichotomius nisus* (Olivier, 1789) | 2 | 0 | 2 |
| | *Ontherus digitatus* Harold, 1868 | 0 | 5 | 5 |
| ONTHOPHAGINI | *Onthophagus* aff. *hirculus* Mannerheim, 1829 | 0 | 2 | 2 |
| | *Digitonthophagus gazella* (Fabricius, 1787) | 1 | 0 | 1 |
| PHANAEINI | *Diabroctis mimas* Linnaeus, 1758 | 0 | 1 | 1 |
| | Total abundance | 482 | 1661 | 2143 |
| | Richness | 18 | 16 | 21 |

**Key to the species of Scarabaeinae collected with pitfall traps at the FLONA Contendas do Sincorá** (based on the key to the New World Scarabaeinae genera; Vaz-de-Mello *et al.* 2011)

1 – Tip of mesoscutellum clearly visible between bases of elytra, exposed portion triangular; clypeogenal teeth "M" shaped; body size about 2cm ..... *Malagoniella astyanax* (Figure 1A).
– Mesoscutellum completely covered by elytra; clypeogenal teeth shaped differently. ..... 2

2 – Side of pronotum with deep longitudinal sulcus; body size about 4 mm. ..... *Uroxys bahianus* (Figure 1B).
– Pronotum without deep longitudinal sulcus on each side. ..... 3

3 – Anterior legs with trochantofemoral anterior foveae; head, lateral portion of the pronotum and elytra and posterior region of elytra with well pronounced and alongated pilosity; body size about 3 mm. ..... *Trichillum externepunctatum* (Figure 1C).
– Anterior legs without trochantofemoral foveae; body without evident pilosity or very short and soft. ..... 4

4 – Lenght of basal metatarsomere longer than that of the three following tarsomeres combined. ..... 5
– Lenght of basal metatarsomere less than that of the three following tarsomeres combined. ..... 6

5 – Body size about 1cm, coloration brown with yellowish spots; yellow femurs, with round brownish patches. ..... *Digitonthophagus gazella* (Figure 1D).
– Body size about 0.5cm, completely brown or copper colored, often with metallic reflection; femurs completely brownish. ..... *Onthophagus* aff. *hirculus* (Figure 1E).

6 – Apex of the elytral interstriae 3, 5, 6 and 7 with evident tubercles or short carinae; some males can also present tubercles next to the center of interstriae 2, 3, and 4. ..... 7
– Specimens do not present the tubercles or carinae mentioned before. ..... 8

7 – Protarsus absent; males without tubercles next to the center of interstriae 2, 3, and 4; tubercles or carinae present only at the apex of interstriae 3, 5, 6 and 7. ..... *Deltochilum* aff. *calcaratum* (Figure 1F).
- Protarsus present; males well-developed with tubercles next to the center of interstriae 2, 3, and 4; tubercles or carinae present at the apex of interstriae 3, 4, 5, 6 and 7. ..... *Deltochilum verruciferum* (Figure 1G).

8 – Mesotarsomeres and metatarsomeres without claws, with five tarsomeres; clypeus without conspicuous teeth; head with two transverse carinae, one frontoclypeal and the other can be raised as pair of horns in male. ..... *Diabroctis mimas* (Figure 1H).
– Mesotarsomeres and metatarsomeres with claws; clypeus with conspicuous teeth; head without transverse carinae. ..... 9

9 – Mesotibia and metatibia gradually widened apically, or not widened; body size less than 1cm, with or without colored metallic reflection. ..... 10
– Mesotibia abruptly widened apically, body size ranges between 0,5 and 2cm; body completely black, with or without metallic reflection. ..... 14

10 – Clypeus bidentate; body completely black with silky reflection; body size around 6mm. ..... ..... *Canthon* aff. *substriatus* (Figure 1I).
– Clypeus quadridentate. ..... 11

11 – Clypeal teeth widened, with apex slightly rounded. 12
– Clypeal teeth thin, with apex pointed. ..... 13

12 – Body rounded and completely black; elytra with silky reflection; body ranges between 4 and 6mm. ..... ..... *Canthon* aff. *piluliformis* (Figure 1J).
- Body more elongated than rounded; pronotum black and elytra variegated, with brownish and black spots. The black spots are rounded in the posterior portion of the elytra (in some specimens these spots can be inconspicuous. ..... ..... *Canthon lituratus* (Figure 1K).

13 – Body with a strong metalic coloration, can be dark green, copper, or dark brown (elytra usually present a more pronounced coloration); inner border of metatibia with an accentuated curvature along its lenght; specimens with at least 8mm. ..... *Canthon* aff. *curvipes* (Figure 1L).
– Pronotum with a metalic coloration in tones of dark green or copper; elytra with an opaque or weak shine; inner border of metatibia with a soft curvature or almost straight; specimens with body size until 6mm. ..... ..... *Canthon* sp. (Figure 1M).

14 – Inner apical angle of protibia ~ 90°; propleura deeply excavated anteriorly, with excavation delimitated on the posterior region for a vertical wall and a transverse carina. ..... *Ateuchus semicribratus* (Figure 1N).
– Inner apical angle of protibia > 90°; propleura only weakly excavated anteriorly. ..... 15

15 – Head with three tubercles, one central and two lateral. The central tubercle is positioned more anteriorly; meso and metatibiae dilatated from curvature of inner margin only; body size around 8mm. ..... ..... *Canthidium manni* (Figure 1O).
- Specimens without such combination of characteres. .. 16

16 – Body elongated, with rectangular shape; clypeal teeth incospicuous or absent; head without horns; body size around 0.9mm. ..... *Ontherus digitatus* (Figure 1P).
- Body oval shaped or truncated, distinctly convex; clypeus bidentated; head with horns. ..... 17

17 – Pronotum with comma shaped fovea at the postero-lateral border. ..... *Dichotomius* aff. *laevicollis* (Figure 1Q).
– Pronotum without the caracteristic mentioned above. 18

18 – Clypeus with two small teeth, almost incospicuous; body with less than12mm. ..... ..... *Dichotomius puncticollis* (Figure 1R).
– Clypeus with two well defined teeth; body generaly with at least 12mm. ..... 19

19 – Pronotum and elytra with a shining reflex; females with a triangular shaped head, with clypeus prolongated anteriorly, similar to a "snout". ..... ..... *Dichotomius* aff. *triangulariceps* (Figure 1S).
– Elytra with an opaque reflex; head with a more wide shape. ..... 20

20 – Central portion of metasternum with abundant and long pilosity. ..... *Dichotomius nisus* (Figure 1T).
– Central portion of metasternum without pilosity. ..... ..... *Dichotomius geminatus* (Figure 1U).

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